H-85-11

Library

NATIONAL MARINE FISHERIES SERVICE

SOUTHWEST FISHERIES CENTER

HONOLULU LABORATORY

P.O. BOX 3830

HONOLULU, HI 96812

December 1985

LIBRARY

DEC 2 6 1985

National Marine Fisheries Service
2570 Dole Street
Honolulu, Hawaii

GREEN TURTLE RESEARCH ON LISIANSKI ISLAND, 1983

ALAN K. H. KAM
Southwest Fisheries Center Honolulu Laboratory
National Marine Fisheries Service, NOAA
Honolulu, Hawaii 96812

Not for Publication

ADMINISTRATIVE REPORT H-85-11

This report is used to insure prompt dissemination of preliminary results, interim reports, and special studies to the scientific community. Contact the authors if you wish to cite or reproduce this material.

Southwest Fisheries Center Administrative Report H-85-11

GREEN TURTLE RESEARCH ON LISIANSKI ISLAND, 1983

Alan K. H. Kam
Southwest Fisheries Center Honolulu Laboratory
National Marine Fisheries Service, NOAA
Honolulu, Hawaii 96812

December 1985

[NOT FOR PUBLICATION]

INTRODUCTION

The Southwest Fisheries Center Honolulu Laboratory, National Marine Fisheries Service (NMFS), NOAA, established a two-person research field camp on Lisianski Island, Northwestern Hawaiian Islands (NWHI, see Fig. 1), from 25 April to 9 August 1983, to study the Hawaiian monk seal, Monachus schauinslandi, and the green sea turtle, Chelonia mydas. This report describes the results of the green turtle research.

METHODS

Turtle censuses were conducted every other day between the hours of 1300 and 1500 (Hawaii standard time) in conjunction with monk seal censuses. Seal and turtle census data were recorded on the same preprinted form (see Alcorn and Buelna[1]). Turtles that were observed basking or swimming were identified by age class. Age classification was based on size: juvenile (<65 cm); subadult (65-80 cm); and adult (>80 cm). Only in the adult age class could the sex be determined by external physical characteristics. Adult males have a 35-45 cm long prehensile tail that extends beyond the hind flippers, while adult females have a shorter tail, 20-25 cm long (Balazs 1980). Also, the adult male's tail ends in a hard, scaled tip which is used during mating.

Green turtles in the NWHI have been tagged with plastic and metal alloy tags by various research groups to document interatoll movement, foraging and nesting site specificity, reproductive history, and growth. Major turtle tagging efforts have been conducted by: Division of Aquatic Resources, State of Hawaii; U.S. Fish and Wildlife Service; Hawaii Institute of Marine Biology, University of Hawaii; and the NMFS. Because of the possibility that a basking turtle on Lisianski Island could already have an identifying tag, the census form provided space for entry of the tag number.

Two observers conducted a census. While one observer went north from camp (Sector 49), the other went south, and the census ended when they met. Figure 2 shows census sector boundaries used on Lisianski Island. During the census, human disturbance of seals and turtles was kept to a minimum, with observations made at a distance with binoculars.

Additional turtle surveys were conducted 2 days a week. These involved more intensive observations and censuses of swimming and basking animals and capture of juveniles nearshore by hand and large scoop net for tagging purposes. When feeding aggregations were encountered, special effort was made to conduct snorkel surveys of the benthic algae to obtain food forms

---

[1]Alcorn, D. J. and E. Buelna. The Hawaiian monk seal on Laysan Island: 1983. Manuscr. in prep. Southwest Fisheries Center Honolulu Laboratory, National Marine Fisheries Service, NOAA, Honolulu, HI 96812.

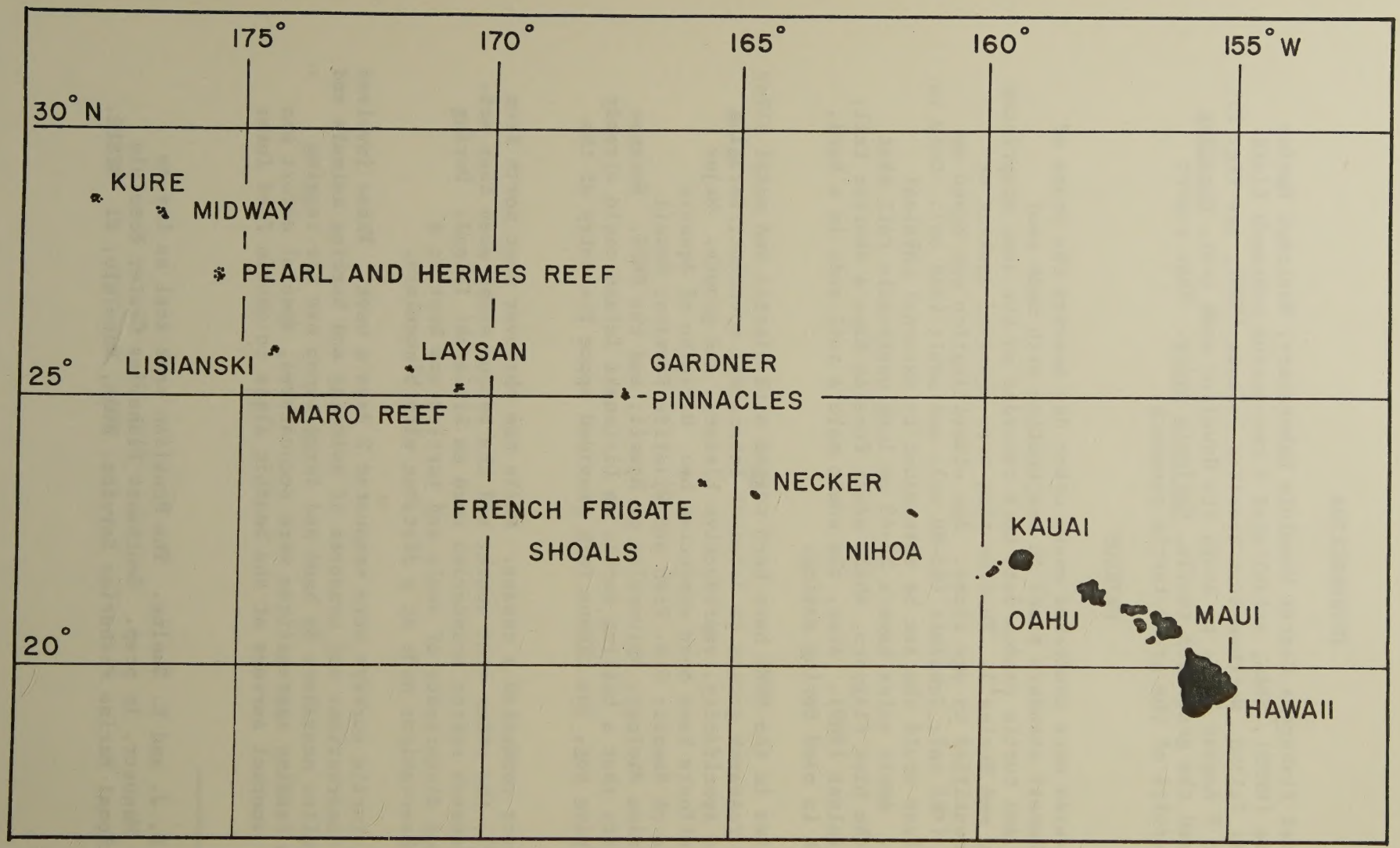

Figure 1.--The Hawaiian Archipelago showing the location of Lisianski Island in the Northwestern Hawaiian Islands.

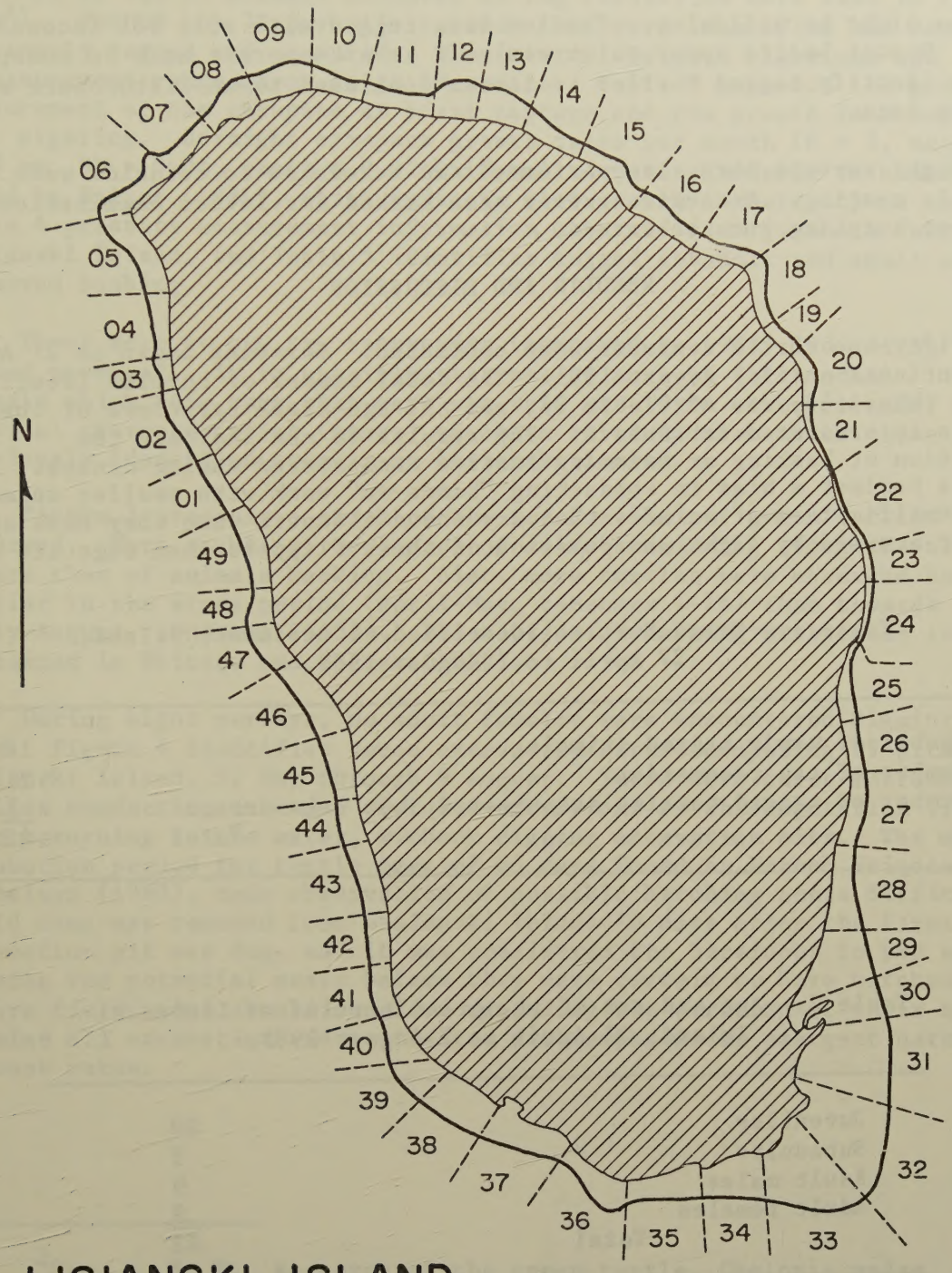

Figure 2.--Lisianski Island perimeter divided into 49 sectors.

turtles might be utilizing. Turtles were tagged with size 681 Inconel[2] tags. Dupont Lucite spray paint was used as a temporary mark to conspicuously identify tagged turtles to lessen continued human disturbance when reading tags.

Night surveys were also performed and scheduled to coincide with possible nesting. Excavation sites were marked for future examination for emergent hatching success rates.

RESULTS AND DISCUSSION

Fifty-two turtle censuses were conducted. Censuses began on 27 April and continued until 7 August 1983. The total number of turtles identified during this study was 42 (Table 1), and the age class structure of these animals is presented in Table 2. The results do not indicate the proportion of basking or swimming turtles encountered during census. The numbers reflect a bias in conducting "hands-on" work with smaller animals and identification of animals that are sound sleepers when they bask and are not aroused by light manipulation of their flippers when tags are read.

Table 1.--Green turtles identified at Lisianski Island, 27 April to 7 August 1983.

Number of newly tagged animals	18
Number of tag recoveries	21
Number of tagged turtles encountered, but tags unread	3
Total	42

Table 2.--Age and sex of the green turtles at Lisianski Island, 27 April to 7 August 1983.

Juveniles	20
Subadults	5
Adult males	9
Adult females	8
Total	42

[2]Reference to trade names does not imply endorsement by the National Marine Fisheries Service, NOAA.

All of the 21 animals observed as tag recoveries were seen in 1982 (Kam[3]). Ten of the 20 juvenile turtles that were identified had been previously tagged and measured. The interval between sightings and remeasurement ranged from 11 to 59 months. Table 3 presents the growth measurement of the carapace at first capture and the growth increment at next sighting. Straight carapace growth rates per month (N = 5, mean = 0.08 cm, SD = 0.05, range = 0.02-0.15 cm) compare similarly to numbers found by Balazs (1981), which indicate slow growth to maturity in the NWHI. Table 4 presents measurement information obtained from juvenile turtles on Lisianski Island, and Table 5 identifies tagged subadult and adult animals observed basking.

There were no new tag recoveries (compared to 1982) indicating inter-island movement. It is possible that one or more of three adult animals which bore tags that were not read were from other islands, as the physical characteristics (scars) of these three did not match those of previously identified animals on Lisianski Island.

Figure 3 presents a graph of the total number of green turtles observed. More sightings were made of animals swimming along the nearshore waters than of animals basking. Also, more turtles were observed basking earlier in the study period (April-May, censuses 1-16) than towards the end (July-August, censuses 34-52). Description of basking strategies is contained in Whittow and Balazs (1982).

During night surveys, no adult females were encountered digging nest pits. Figure 4 identifies seven excavation sites (composing 19 pits) dug on Lisianski Island, 31 May through 9 August. There were three instances of turtles conducting extended distance excursions to the vegetation line and then returning to the water, without digging excavation pits. The mean incubation period for turtle eggs of 65 days found at French Frigate Shoals by Balazs (1980), made observation of possible hatching nests difficult. The field camp was removed from Lisianski Island 70 days after the first excavation pit was dug, and it was considered too hazardous to the eggs to examine the potential nests before they were certain to have hatched. Future field camps should consider extending the duration of their stay to examine all excavation and nest sites with emphasis on emergent hatchling success rates.

---

[3]Kam, A. K. H. Research of the green turtle, Chelonia mydas, at Laysan Island, Lisianski Island, and Pearl and Hermes Reef, summer 1982. Manuscr. in prep. Southwest Fisheries Center Honolulu Laboratory, National Marine Fisheries Service, NOAA, Honolulu, HI 96812.

Table 3.--Growth measurements for juvenile green turtles, Chelonia mydas, recaptured at Lisianski Island, 25 April to 9 August 1983 (C = curved length x width, S = straight length x width).

Tag No.	Date first measured	Measurements (cm)	Date of recovery and measurement	Measurement (cm)	Interval in months	Growth rates per month (cm)
2843, 2844	7/20/78	C 53.3 x 47.0	5/9/83	C 59.0 x 51.4	59	C 0.10
2851, 2852	10/3/78	S 42.5 x 32.4	5/6/83	S 50.7 x 38.1	56	S 0.15
2857, 2858	8/7/82	C 56.5 x 52.6	5/29/83	C 60.1 x 53.7	11	C 0.33
5828	4/12/82	C 53.0	5/31/83	C 53.9 x 46.5	15	C 0.06
5829, 6753	4/18/82	C 50.0	5/10/83	C 51.0 x 45.7	13	C 0.08
5833, 6759	5/17/82	S 52.0	5/24/83	S 53.2 x 43.1	12	S 0.10
5854, 6325	7/13/82	S 58.2 x 48.7	5/30/83	S 59.4 x 49.4	12	S 0.10
6281, 6282	8/13/82	S 59.5 x 49.3	5/24/83	S 59.7 x 49.3	11	S 0.02
2859, 2860	8/15/82	S 42.0 x 35.9	6/9/83	S 42.3 x 36.2	11	S 0.03
6316, 6317	8/28/82	C 52.5 x 48.6	7/4/83	C 53.2 x 49.8	11	C 0.07

Table 4.--Measurements obtained from juvenile green turtles on Lisianski Island, 25 April to 9 August 1983.

Tag No.	Date 1983	Measurements (cm) Straight length by width	Curved length by width	Plastron length	Head width	Tail length	Right front flipper width
[1]2843, 2844	5/9	--	59.0 x 51.4	--	--	--	--
[1]2851, 2852	5/6	50.7 x 38.1	54.1 x 45.2	41.4	7.7	10.5	9.0
[1]2857, 2858	5/29	--	60.1 x 53.7	--	--	--	--
[1]5828	5/31	--	53.9 x 46.5	--	--	--	--
[1]5829, 6753	5/10	--	51.0 x 45.7	--	--	--	--
[1]5833, 6759	5/24	53.2 x 43.1	57.3 x 51.6	43.2	8.2	10.6	--
[1]5854, 6325	5/30	59.4 x 49.4	64.9 x 57.9	48.6	9.2	12.5	9.8
[1]6281, 6282	5/24	59.7 x 49.3	64.0 x 59.7	49.4	8.8	14.3	--
6760, 6761	5/24	48.6 x 39.5	51.9 x 46.8	38.7	7.5	9.8	8.2
6766, 6769	6/1	--	55.2 x 48.7	--	--	9.5	9.0
6770, 6771	6/3	39.7 x 33.3	42.0 x 38.7	31.9	6.8	8.5	--
6772, 6773	6/3	38.4 x 33.8	40.6 x 38.7	30.3	6.4	6.3	6.9
6776, 6777	6/3	42.1 x 34.4	44.3 x 39.3	33.8	7.0	9.2	7.2
[1]2859, 2860	6/9	42.3 x 36.2	44.6 x 41.7	33.7	7.1	7.5	7.8
6779, 6780	6/15	46.3 x 38.2	49.0 x 45.2	38.3	7.3	7.7	--
6782, 6783	7/3	48.1 x 39.5	50.7 x 45.7	38.8	7.3	8.7	8.2
[1]6316, 6317	7/4	--	53.2 x 49.8	--	--	--	--
6784, 6785	7/11	43.3 x 34.8	45.9 x 40.0	35.9	7.1	8.2	7.1
6786, 6787	7/21	--	42.5 x 39.4	--	--	7.5	7.1
6788, 6789	7/21	--	51.7 x 48.0	--	--	9.0	9.3

Straight length

N = 12
Range = 38.4-59.7
Mean = 47.7
SD = 7.1

Straight width

N = 12
Range = 33.3-49.4
Mean = 39.1
SD = 5.3

[1]Tag recovery.

Table 5.--Green turtles observed basking on Lisianski Island, 25 April to 9 August 1983 (SA = subadult, A = adult).

Tag No.	Date of first observation	Stage of maturity	Sex	Sector location
[1]5843, 6288, 6289	5/4/83	SA	Unknown	10
6755	5/16/83	SA	Unknown	25
6764	6/1/83	SA	Unknown	25
[1]2942, 2943, 2961	6/8/83	SA	Unknown	27
[1]6276, [1]6277	8/3/83	SA	Unknown	30
[1]T211, 6303, 6304	5/29/83	A	Female	5
[1]1298, 1299	5/27/83	A	Female	33
[1]5832, 6489, 6767	5/25/83	A	Female	6
6291, 6328	5/7/83	A	Female	25
6751	5/4/83	A	Female	27
6762	5/24/83	A	Female	30
6774, 6775	6/3/83	A	Female	11
[2]6778	6/15/83	A	Female	27
[1]430, 6290, 6752	5/3/83	A	Male	26
[1]T259, 2958	5/3/83	A	Male	20
6754	5/12/83	A	Male	26
6763	5/30/83	A	Male	8
[2]6765	6/1/83	A	Male	
[3]6768	6/1/83	A	Male	4
6478	5/9/83	A	Male	8
[1]465, 5940, 6781	6/27/83	A	Male	27
6756, 6857, 6758	5/18/83	A	Male	26

[1]Tag recovery.
[2]Animal had two other tags which were illegible.
[3]Animal had one other tag which was illegible.

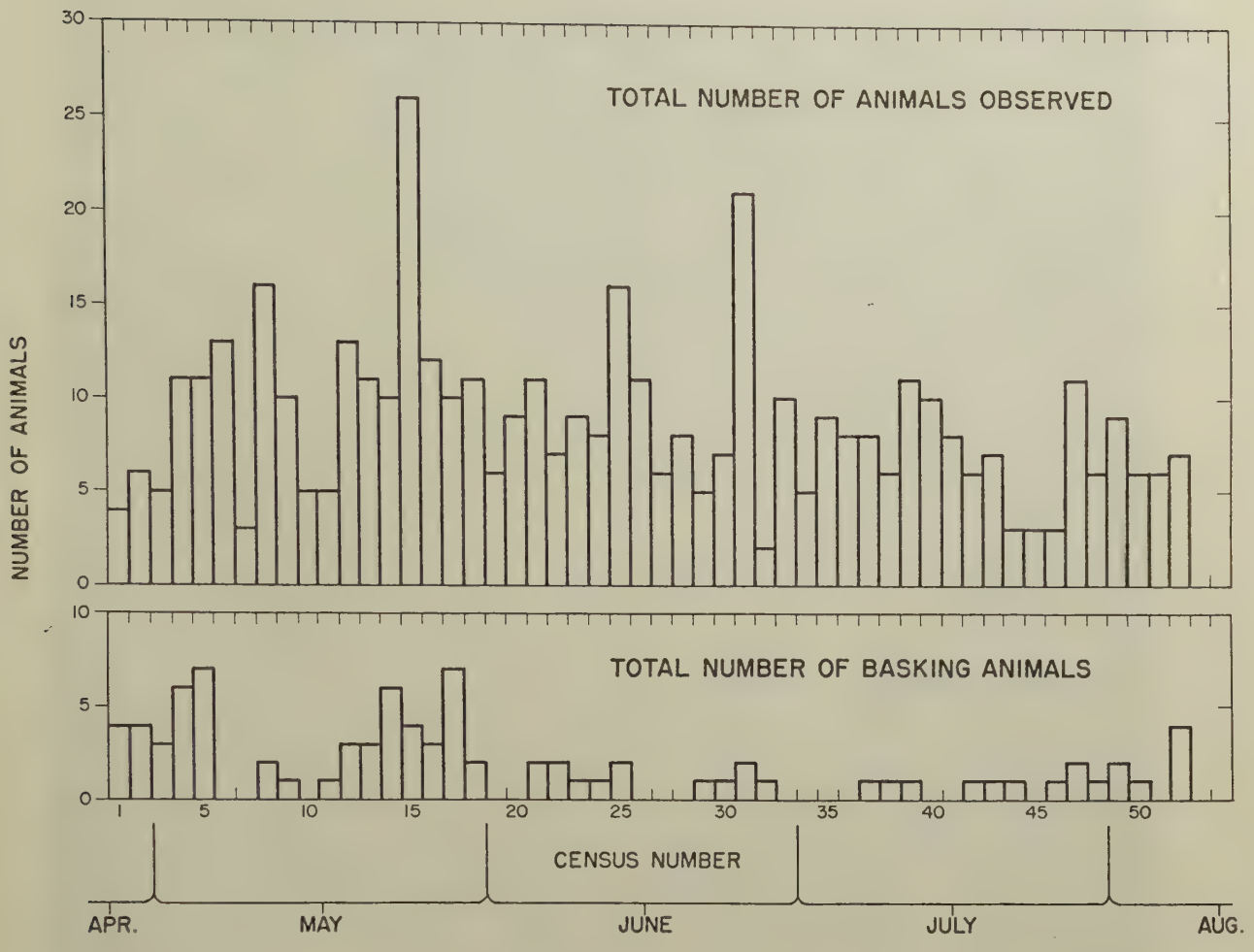

Figure 3.--Number of green turtles observed during census on Lisianski Island, 27 April-7 August 1983.

Figure 4.--Excavation sites and extended distance excursions to the vegetation line without excavation on Lisianski Island, 31 May-8 August 1983.

LITERATURE CITED

Balazs, G. H.
1980. Synopsis of biological data on the green turtle in the Hawaiian Islands. U.S. Dep. Commer., NOAA Tech. Memo. NMFS, NOAA-TM-NMFS-SWFC-7, 141 p.

1981. Growth rates of immature green turtles in the Hawaiian Archipelago. In K. A. Bjorndal (editor), Biology and conservation of sea turtles, p. 117-125. Proceedings of the World Conference on Sea Turtle Conservation, November 1979, Wash., D.C.

Whittow, G. C., and G. H. Balazs.
1982. Basking behavior of the Hawaiian green turtle (Chelonia mydas). Pac. Sci. 36:129-139.